

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Unlicensed Operation in the TV Broadcast Bands)	ET Docket No. 04-186
)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band)	ET Docket No. 02-380
)	

REPLY COMMENTS OF TROPOS NETWORKS

Tropos Networks ("Tropos") submits these reply comments in response to the Federal Communications Commission's ("Commission") Further Notice of Proposed Rulemaking ("FNPRM") in the above proceedings.¹ These proceedings examine using broadcast television spectrum, the so-called TV white space, to deliver two way broadband services. Tropos responds to comments opposing contention based/spectrum sensing technologies and objections to portable and mobile devices in the TV White Space.

Tropos reiterates its position that the TV White space be allocated for unlicensed operations using contention based technology for fixed and mobile devices. The record makes clear how unlicensed operations in the TV white space will expand affordable broadband.²

¹ *Unlicensed Operation in the TV Broadcast Bands*, First Report and Order and Further Notice of Proposed Rule Making, 21 FCC Rcd 12266 (2006) ("FNPRM").

² Contrary to the assertion of Qualcomm, Comments of Qualcomm at 6 (January 31, 2007) the record of this and other Commission proceedings is replete with the benefits of expanding

Contention based technology is a proven and mature technology and will protect TV broadcasters. The Commission's decisions should embrace it; the technology is the most expeditious means to bring affordable broadband access to all Americans.

Contention Based Spectrum Sensing Technology Will Promote Broadband and Protect Incumbent Broadcasters

Objections to unlicensed use of the TV white space are tangled with those challenging the capability of spectrum sensing technologies. Interests opposing unlicensed use advocate doubt regarding contention based technologies, such as the dynamic frequency selection (DFS) proposed by the Commission, while also promoting overly restrictive technical and operational rules that will choke broadband rollout should it be permitted. The Commission should reject these positions. Contrary to broadcast interest advocacy, contention based technology does not have to be invented.³ It will not create an environment where consumers have no remedy nor will it destroy over the air broadcasting by the prevalence of the hidden node.⁴

The "hidden node" objection is a refrain of objecting interests. Under the hidden node, an obstruction, such as a building, lies between the broadcast signal and the unlicensed device, the premise is that the unlicensed device will not discern and protect the broadcast signal. This is incorrect. Several pragmatic reasons show why the Commission should embrace contention based spectrum sensing technology. The propagation quality of the broadcast bands, that the

unlicensed operations and the need to commit more spectrum to unlicensed environments. Tropos Comments at 5-6 (January 31, 2007).

³ Joint Comments of the Association of Maximum Service Television, Inc. and the National Association of Broadcasters (November 30, 2004) at 15, Comments of Qualcomm at ii and 4 (January 31, 2007)

⁴ Joint Comments of the Association of Maximum Service Television, Inc. and the National Association of Broadcasters (January 31, 2007) at 15-20.

unlicensed device only needs to detect the signal not reproduce it and that a TV signal, unlike radar transmission in the 5 GHz band where contention based technology is the standard ensuring coexistence, is designed to be detected, all promote highly sensitive detection ability.

Unlicensed operations in the TV white space will not leave the consumer with no remedy. Opposing interests ignore that the 2.4 GHz band is a robust environment that is today delivering broadband and a range of other services, all of which are coexisting. The enormous investment in technology and deployment ensures quality service and will protect incumbent licensees. The technology is directly accountable to the investment and will be lost if interference with broadcast operations occur.

The reality that consumers comprehend how services and technologies work and can be integrated should underlie the Commission's examination and the rules it sets. The ability of the consumer not only to comprehend but to accommodate the environment should not be understated. Detailed debate addressing the placement of a television and unlicensed devices using the TV white space ignores the reality that consumers are performing much more complex tasks daily. As the New America Foundation notes, the Commission should attribute to the consumer what already is clearly demonstrated in the computer environment, individuals in the same household or even same neighborhood can coordinate the positioning and use of devices and have been doing for years.⁵

The comments of the coalition of Dell, Google, Hewlett Packard, Intel, Microsoft and Philips Electronics summarize well the attributes of contentions based technology. It is a proven, well understood technique that "obviates the need for base stations, geo-location or control signals,

⁵ Technical Comments of the New America Foundation at page 10.

and that the Commission should authorize its use for unlicensed personal/portable devices.”⁶ Unlicensed devices using a contention based technology are a far better alternative to avoid harmful interference to incumbents than geo-location/database and control signal approaches. Use of a contention based/spectrum sensing approach (1) avoids the inherent conflict in having TV band incumbents responsible for a database that controls access to the band, and (2) avoids the accuracy and reliability infirmities of the geo-location/database approach. As noted by the Coalition, even if the geo-location/database and control signal approaches are feasible, they are neither practicable nor desirable.⁷ As Tropos has stated previously the Commission should not impose costly and bureaucratic requirements that fall short of the accuracy and reliability presented by contention based technology.

The Commission should embrace contention based/spectrum sensing technology by unlicensed fixed and portable devices in the TV white space. While GPS and control signal technologies may present viable options, neither should be mandated. Both provide no additional protection and present substantial costs and logistics. Tropos is confident that unlicensed devices will emerge from the Commission’s intended equipment authorization process demonstrating capability and reliability. That process should adhere to the Commission’s historic approach where a threshold of specific technical performance requirements are articulated so that equipment can be directly and objectively tested during the process. Objective, technology neutral and transparent standards are crucial.

⁶ Dell Inc., Google, Inc., the Hewlett-Packard Company, Intel Corp., Microsoft Corp., and Phillips Electronics North America Corp. (“Coalition”) Comments at 4-5.

⁷ Coalition Comments at 9-12.; New America Foundation, et al., Comments at 65-67, 69-71 (stating that spectrum sensing and dynamic frequency selection can adequately protect TV band incumbents and would be more cost effective and efficient to implement than geo-location. database and control signal approaches).

There Should Be No Restrictions on Personal/Portable Devices

Critical to expanding broadband access is the availability of low power personal devices to operate in the TV white space. Without portable/mobile devices, the spectrum will be squandered. Like opposition to contention based technologies, the debate surrounding portable/mobile devices is entwined in the position of those objecting to unlicensed use in the band.⁸ Wi-Fi deployments in the 2.4 GHz demonstrate the competitive market's ability to enable affordable broadband access through laptops, PDAs, and other proprietary free equipment. Portable/mobile devices operate at much lower power than fixed devices and their danger to cause interference significantly less. Precluding or restricting portable/mobile use in the band will deny consumers the very benefit the Commission seeks to pursue- affordable broadband. Proposals to delay use of portable/mobile devices by commencing a separate rulemaking should similarly be rejected.⁹

Providing for fixed devices but precluding or limiting portable/mobile personal devices is a contradiction in the unlicensed regime. An environment limited to fixed devices will confine access and reduce consumer choice immeasurably. It will remove an important part of the wireless environment- nomadicity, the ability to move about yet stay connected. Failing to provide for low power operations with reasoned technical and operational rules will be devastating. It will deny the American consumer affordable broadband access and equipment. It

⁸ Joint Comments of the Association of Maximum Service Television, Inc. and the National Association of Broadcasters (January 31, 2007) at 33-34.

⁹ IEEE 802.18 Radio Regulatory Technical Advisory Group, Comments at 4. Notably that the Commission asked commenters to address whether and how one interference avoidance scheme could be used effectively for both types of TV band devices, NPRM at ¶25.

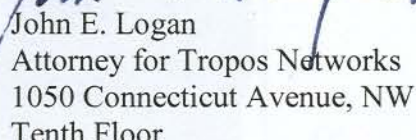
will separate a key feature of the unlicensed environment, the ability of consumers to select devices that are flexible, mobile and affordable.

Conclusion

Despite continued advocacy indicating resistance to an unlicensed contention based environment for fixed and personal devices in the TV white space, there are shades of acknowledgment in the record that the path the Commission is pointed is possible or at least will be acquiesced to. Licensee interests can be protected while the value of this extraordinary spectrum can accrue directly to the consumer through broadband access at substantial cost efficiencies. Tropos urges the Commission to pursue an unlicensed environment in the TV white space that provides for contention based protocols for fixed and personal devices so that this spectrum's value can serve the public as soon as it is available. An emphatic embrace of these objectives will move a proceeding from its potential to be intractable to one that delivers value directly to the American public expeditiously.

Respectfully submitted,

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